

Additional Records of Hawaiian Platyctenea (Ctenophora)¹

DONALD C. MATTHEWS AND SIDNEY J. TOWNSLEY²

IN A PREVIOUS PAPER (Matthews, 1954:282) representative samples of all orders of Ctenophora were reported for Hawaii. Of these, the platyctenids were represented by only two immature specimens of *Coeloplana dubosequii* collected on the reef of the Hawaii Marine Laboratory on December 31, 1952. This small, pale, yellowish-green platyctenid has not been collected since, although the alga (*Hypnea nidifica*) on which it was found has been periodically examined. Also, continuous examination of spines of the slate-pencil urchin, *Heterocentrotus mamillatus* (viz. Utinomi, 1961:116, pl. 58, no. 9), has failed to reveal platyctenids, although Dawydoff (1938:161) reported having collected *Coeloplana weilli* on this urchin in the region of Ream (Gulf of Siam, Cambodia). It is rather ironical that, quite by chance, platyctenids were taken in 1961 on the spines of the black urchin, *Echinothrix diadema*, collected from the sandy bottom in about 10 m of water at the seaward edge of Waikiki reef. Again, in January, April, and May 1962, and in April 1963, platyctenids were taken on *E. diadema* at about the same depth, near Buoy No. 8, Kaneohe Bay, Oahu.

Coeloplana willeyi Abbott, 1902

Annotat. Zool. Japon, 4:103-108

Coeloplana willeyi Abbott, 1907

Zool. Jahrb. Anat. Ont., 24:41-70 [full description]

Fortunately, as many as 50 platyctenids may crowd the spines of *E. diadema* in Hawaii. Thus, sufficient numbers are available from which a composite picture of this beautiful but extremely variable species can be made. Although their color is described as "scarlet or carmine red, fading toward the edges to a yellowish pink"

(Abbott, 1902:108), this characteristic in Hawaiian specimens warrants further explanation. Distribution on spines seems color-correlated. Alternate purple and white rings characteristic of large spines of young *E. diadema* (vide Utinomi, 1961:113, pl. 57, no. 6) ultimately darken and fuse into black. Small *C. willeyi*, whose tentacular axes do not exceed ring widths, occur more frequently on dark rings; whereas large *C. willeyi*, whose tentacular axes exceed ring widths, occur more frequently spirally arranged on dark rings. However, both small and large platyctenids seem distributed indiscriminately over black spines of older urchins. Both small and large specimens appear lighter when removed to a light background.

Background, however, is only one factor which affects color; another is their ever-changing shape. As described by Abbott (1907:46), certain relaxed regions may flow in one direction like a thin film which, because of widely separated pigment granules, appears extremely light in contrast to certain contracted regions which appear dark. These "flows" may be limited to one side of the main (tentacular) axis, resulting in a highly asymmetrical, partially light and partially dark body, or they may proceed simultaneously in all radii, resulting in a thin, almost circular, pinkish-yellow film. Although Abbott (1907:47) states: "about the periphery there is a series of white or yellowish-white spots or flecks of color . . .," and Komai (1922:93) extends these to include the bases of the dorsal papillae, in the Hawaiian representatives of this species these spots or flecks are only weakly developed. Dependent, then, upon the above considerations *C. willeyi* in Hawaii may be described as deep purple, red, pink, or yellowish-white, and any one animal may reveal simultaneously all of these various colors. There is, however, an overall tendency for the region along the tentacular axis to be darkest. The ventral surface is uniformly grayish-white.

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² Department of Zoology, University of Hawaii, Honolulu.

As mentioned by Abbott (1907:47) "... measurements of *Coeloplana* are not of much value in an animal of such great mobility. When fully contracted the shape of the body ... is nearly circular. *C. willeyi*, in such conditions usually measures 1-2 cm. across. ..." Komai (1922:93) gives the range of the Misake representatives of this species as "... 20-60 mm. (in extended state)." The range of the Hawaiian representatives is from 2 mm (contracted) to 32 mm (relaxed).

Besides the well-developed tentacular apparatus, which may extend colorless, cydippid-like tentacles to many times the body diameter, numerous dorsal tentacles (papillae) are present. Komai (1922:9) gives the number of these dorsal papillae as commonly 20-30. Yet, these minute, club-shaped outgrowths of the gastrovascular canals are not well developed in Hawaiian representatives of this species for, as stated by Abbott (1907:48), "The body tissue of *C. willeyi* is so loose and the animal itself so 'amoeboid' in its movements that it is impossible to tell, in the living specimen, just what arrangement these dorsal tentacles have. ..." They tend to disappear when the animal relaxes, and reappear, especially when contraction is along the tentacular axis. In such instances, two poorly defined sagittal "rows" appear, but it is difficult to determine which papillae are derived from paratentacular canals and which are derived from parastomacal canals. While dorsal papillae may be arranged on one side of the tentacular axis in a 2-4-4-2 series, the other side may be arranged in a 2-3-4-1 series. In other specimens only the 2-3 series is present on one side, while on the opposite side, a 2-3-5-1 series is present. Of the many specimens observed, not one exhibited a symmetrical arrangement of dorsal papillae. Their total number ranged from 18-24. Variations in size, number, and arrangement of dorsal papillae are not restricted to *C. willeyi*. Dawydoff (1938:160) says of *C. perrieri*:

Close examination shows that the apparatus in question is based, in our species, on the most diffuse scheme in the *Coeloplanidae*, that is to say, that the aboral papillae are arranged in four irregular rows (each one containing 4 or 5 papillae) so that the paratentacular papillae cannot be distinguished externally from the para-

stomacal papillae. Moreover, in each row, the papillae have lost their usual alignment and generally show an embarrassing disorder to the observer. [Authors' translation.]

The aboral sense organ is clearly discernible as a small, unpigmented area in the center of the tentacular axis. Although Abbott (1907:47) states that the comparatively small otolith of living *C. willeyi* is frequently difficult to find, in Hawaiian representatives the pit in which it lies is closed by fleshy lips only when this region of the organism contracts. When this region relaxes, the otolithic mass is clearly seen and displays the usual, constant vibrating motion. The internal (concave) and external (convex) surfaces of the two slightly elevated semicircular polar plates are devoid of digitiform papillae, thus conforming to Komai's (1922:14) statement that in *C. willeyi* lobation of polar plates does not occur. Rudimentary ciliary bands are present, but beating cilia are seen only on polar plates and oral surface.

As previously reported for *C. dubosequii* (Matthews, 1954:284), prominent excretory pores are located just outside the border of each polar plate. These pores appear and disappear as the gastrovascular system relaxes and contracts. In *C. willeyi* the region beneath an excretory pore forms a large temporary reservoir which, as it fills, protrudes as a light thin-walled hemisphere equal in size to the dorsal sense organ. The excretory "pore" is thus carried aloft and, as it opens, expulsion of materials quickly obliterates the reservoir. These "reservoirs" fill and empty neither simultaneously nor alternately; but, rather, one may function many times before the other becomes operative.

Both living and stained (with acidulated borax-carmine and indulin) specimens show no trace of gonadal development, despite the fact that their size suggests sexual maturity. This, however, strengthens Komai's (1922:32) contention that "... besides some negligible exceptions, the breeding season of *Coeloplana* may be said to extend from early summer to early fall, the gonads developing in the main during summer months and the spawning taking place generally in late summer or in early autumn."

The fact that three urchins are now known to serve as hosts for platyctenids (*C. echinicola*

Tanaka on *Toxopneustes pileolus*; and *C. willeyi* Abbott on *Heterocentrotus mamillatus* and *Echinothrix diadema*) suggests an extensive fauna on these widely distributed echinoderms.

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